



**US Army Corps  
of Engineers®**



**Statewide Dam Visual Conditions Survey  
for the islands of Maui, O'ahu, Hawai'i, and Moloka'i  
and re-inspections on the island of Kaua'i  
Final Report  
April 2006**

**Volume 2 - Hawai'i Island  
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Department of Land and Natural Resources

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**STATEWIDE DAM VISUAL CONDITIONS SURVEY  
FOR THE ISLANDS OF MAUI, O‘AHU, HAWAI‘I, AND MOLOKA‘I  
AND RE-INSPECTIONS ON THE ISLAND OF KAUA‘I  
APRIL 2006**

**1. INTRODUCTION**

By Hawai‘i Revised Statutes Chapter 179D, and Hawai‘i Administrative Rules Title 13, Chapter 190, “Dams and Reservoirs”, the State of Hawai‘i Department of Land and Natural Resources (DLNR) is authorized to conduct dam safety inspections throughout the State of Hawai‘i to assure public safety.

Beginning around February 20, 2006, the Hawaiian Islands experienced unusually severe rain showers that caused severe flooding throughout the State. On March 14, 2006, the privately-owned Kaloko Dam on the island of Kaua‘i failed sending a wall of water downstream that overtopped the Morita Dam, damaged Kuhio Highway, and swept away homes.

Governor Lingle’s Proclamation and multiple Supplementary Proclamations provide relief for disaster damages, losses, and suffering, and to protect the health, safety, and welfare of the people.

In coordination with the State of Hawai‘i Department of Land and Natural Resources (DLNR), the U.S. Army Corps of Engineers (Corps) provided assistance with emergency visual dam inspections under the Emergency Flood Protection Act of 1965 (PL 84-99). This assistance was limited to inspections on the island of Kaua‘i and for a limited duration following the Kaloko disaster.

In view of limited Federal funding, the DLNR enlisted the Corps to provide technical assistance with dam inspections on the islands of Maui, O‘ahu, Hawai‘i, and Moloka‘i under the Corps’ Interagency and International Services (IIS) program. Inspections performed under the IIS program were done on a reimbursable basis with State funds in conjunction with Federal Emergency Management funds.

**2. PURPOSE AND OBJECTIVES**

The purpose of the Statewide Dam Visual Conditions Survey is to determine whether there existed any imminent danger to life and property based on the dam and reservoir conditions at the time of the inspections. This broad-based visual view was intended to provide a sufficient basis for the State to contact the dam owners for follow-up investigations and potential remedial action to assure safe conditions. The dams inspected were identified from the list of regulated dams in the State’s Dam Safety Program as of March 2006. This Statewide Dam Visual Conditions Survey report consolidates and transmits the visual conditions surveys conducted during the period from April 3, 2006 through April 8, 2006 on the islands of Maui, O‘ahu, Hawai‘i, and Moloka‘i, and reinspections on Kaua‘i.

### **3. AUTHORITY**

This work was performed under the Interagency and International Services program, authorized under 10 USC 3036(d), which allows the Corps to provide technical assistance to non-Department of Defense federal agencies, state and local governments, and authorized Indian Nations on a reimbursable basis.

The specific Dam Visual Conditions Survey was performed under the Memorandum of Agreement between the Corps and DLNR’s, Division of Boating and Ocean Recreation, dated 10 July 1996 and Support Agreement Number DL-06-01 between the Corps and State of Hawai‘i, DLNR, Engineering Division, executed on March 27, 2006.

### **4. SCOPE OF ACTIVITIES**

The work activities are located on the islands of Maui, O‘ahu, Hawai‘i, Moloka‘i, and Kaua‘i. The dam safety inspections involved the visual only examination or condition survey of the regulated dam structures, including abutments, spillways, outlet facilities, and reservoir to determine if there exist imminent hazards that could result in the loss of property and life downstream of the facilities. Inspections were guided by the State DLNR’s dam safety inspection checklist.

The findings and recommendations of these inspections are limited to a visual condition assessment of the dam and related features that were visible at the time of the inspection. The inspections are a snapshot of the dam conditions at the time of the inspection. Over time, these conditions will change due to weather conditions and the degree to which they are maintained. Inspectors made no attempt to remove vegetation obstructing vision, perform subsurface investigations, or make any determinations of geotechnical and hydrologic conditions.

### **5. METHODOLOGY**

The Visual Conditions Surveys were conducted under the direction of the DLNR Dam Safety Officer. Eight (8) Corps dam safety and geotechnical personnel from various Corps organizations were accompanied by State DLNR, State Department of Agriculture (DOA), and/or U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) personnel to each site.

The work generally followed the sequence depicted below.

DLNR Provides Dam/Reservoir List, Schedule, and Forms to the Field Inspection Teams → Field Inspection (including inspection checklist/form) → Determination of Immediate Need for Action → Completion of Inspection Form → Quality Control of Inspection Form → Transmission of Inspection Form to DLNR Dam Safety Officer (DSO) and Corps Project Manager (PM) → Generation of Inspection Summary → Transmission of Inspection Summary to DLNR DSO and Corps PM → Generation of Consolidated Report.

The inspection teams were divided into two groups: the Maui group and the O‘ahu group. The Maui teams were responsible for inspections on Maui and Moloka‘i and also conducted re-inspections on Kaua‘i. The O‘ahu teams were responsible for inspections on O‘ahu and Hawai‘i. Operation Centers were established on Maui at the DLNR Annex, on O‘ahu at the DLNR

Kalanimoku Bldg, and on Hawai‘i at the Department of Agriculture’s Waimea office. The Maui group consisted of 5 teams (4 field teams and 1 field/Ops Ctr). The O‘ahu group consisted of 3 teams (2 field teams and 1 field/Ops Ctr).

For each dam inspection the following was typically generated:

- Dam inspection data sheets;
- Inspection summary, including preliminary findings and recommendations;
- Photos of critical dam features and especially of suspected dangerous conditions;
- Panoramic photo shots of dam, including annotations to each photo;
- Sketch of dam features as available;
- Notation of related features;
- Notation of missing features.

The dam inspection data sheets were prepared jointly by the interagency inspection team (Corps and State representatives). In some cases edits were made to the field inspection reports by the State Dam Safety Office in order to clarify information on the reports. These edits were initialed and dated by the Dam Safety Officer or Engineer who made them.

## **6. JOINT INSPECTION TEAMS**

Inspection teams were made up of Geotechnical (GT) personnel from the Corps and State. Corps GT personnel originated from the Honolulu District, Kansas City District, Sacramento District, Louisville District, Buffalo District, Philadelphia District, and Engineer Research and Development Center. State personnel included DLNR Engineering Division, Division of Forestry and Wildlife, Division of Boating and Ocean Recreation, Department of Agriculture, and Natural Resources Conservation Service. Each inspection team was assisted in gaining access and locating the facilities by dam owner representatives.

## **7. FACILITIES INSPECTED**

Appended to this report is a CD containing electronic inspection records for each dam/reservoir inspected during the period of April 3, 2006 to April 8, 2006. Below is a list of the dams/reservoirs inspected. A total of 87 dams were inspected: 53 on the island of Maui; 16 on O‘ahu; 13 on Hawai‘i; 1 on Moloka‘i; and 4 dams were reinspected on Kaua‘i. The re-inspections of the 4 selected dams on Kaua‘i were necessary because, although they were identified to be abandoned, these facilities still possessed the ability to impound water.

### O‘ahu (16) – Volume 1

OA00001 Nuuanu Dam No. 4  
OA00017 Wahiawa Dam  
OA00018 Opaepala 01 Reservoir  
OA00019 Opaepala 02 Reservoir  
OA00020 Opaepala 15 Reservoir  
OA00021 Kemoo 5 Reservoir  
OA00022 Upper Helemano Reservoir  
OA00023 Helemano 6 Reservoir

OA00025 Ku Tree Reservoir  
OA00037 Reservoir 510  
OA00038 Reservoir 530  
OA00039 Reservoir 545A  
OA00045 Helemano 16 Reservoir  
OA00124 Kaneohe Dam  
OA00129 Waimanalo 60 MG Reservoir  
OA00137 Oahu Reservoir No. 155

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Hawaii (13) – Volume 2

HA00026 Lalakea Reservoir	HA00051 Hawi No. 5 Reservoir
HA00027 E-13 Reservoir	HA00052 Kehena Reservoir
HA00040 Waikoloa 50 MG Reservoir	HA00122 Waikoloa 50 MG Reservoir 2
HA00042 Puukapu Reservoir	HA00123 Puu Pulehu Reservoir
HA00043 Puukapu Watershed Retarding Dam R-1	HA00131 Paauilo Reservoir
HA00049 Keaiwa Reservoir	HA00136 Waikoloa 50 MG Reservoir 3
HA00050 Hawi No. 3 Reservoir	

Maui (53) – Volume 3

MA00046 Waikamoi Dam No. 2	MA00086 Maui Reservoir 81
MA00047 Piiholo Reservoir	MA00087 HC&S Reservoir 82
MA00048 Olinda Reservoir	MA00088 Maui Reservoir 84
MA00054 Horner Reservoir	MA00089 HC&S Reservoir 90
MA00055 Wahikuli Reservoir	MA00090 HC&S Reservoir 92
MA00056 Hanakao Reservoir	MA00091 Peahi Reservoir
MA00057 Kahoma Reservoir	MA00092 Papaaea Reservoir
MA00058 Honokowai Reservoir	MA00093 Kaupakulua Reservoir
MA00059 Upper Field 30 Reservoir	MA00094 Kapalaalaea Reservoir
MA00068 Maui Reservoir 14	MA00095 Haiku Reservoir
MA00069 Maui Reservoir 15	MA00096 Pauwela Reservoir
MA00070 HC&S Reservoir 20	MA00097 Kolea Reservoir
MA00071 Maui Reservoir 21	MA00125 Happy Valley Flood Prevention
MA00072 Maui Reservoir 22	MA00126 Kahana Reservoir
MA00073 Maui Reservoir 24	MA00127 Napili 4 and 5 Desilting Basin
MA00074 HC&S Reservoir 25	MA00128 Napili 2 and 3 Desilting Basin
MA00075 Maui Reservoir 30	MA00130 Honokowai Structure #8
MA00076 HC&S Reservoir 33	MA00132 Puu Koa Reservoir
MA00077 HC&S Reservoir 40	MA00133 Pukalani Reservoir
MA00078 HC&S Reservoir 42	MA00134 Koapala Basin
MA00079 Maui Reservoir 52	MA00138 Kahakapao Reservoirs
MA00080 HC&S Reservoir 60	MA00139 Maui Field 290 Reservoir
MA00081 HC&S Reservoir 61	MA00141 Wailuku Project District Retention Basin
MA00082 HC&S Reservoir 70	MA00142 Middle Field 14
MA00083 HC&S Reservoir 73	MA00143 Kailiili Reservoir
MA00084 HC&S Reservoir 74	MA00144 Maui County Water West
MA00085 HC&S Reservoir 80	

Moloka'i (1) – Volume 3

MA00041 Kualapuu Reservoir

Kaua'i (4) – Volume 4

HI00064 Field 2 Kealia	HI00066 Lower Anahola
HI00065 Upper Anahola	HI00067 Field 1 Kealia

## **8. SUMMARY AND LIMITATIONS OF FINDINGS**

Findings for each facility are contained in the individual visual conditions surveys that are appended to this report. These visual assessments yielded condition ratings that ranged from “poor” (may not fulfill intended function; maintenance or repairs are necessary) to “satisfactory” (expected to fulfill intended function) condition with most of the facilities falling in the “fair” (expected to fulfill intended function, but maintenance is recommended) to “poor” category. The limitations of the findings were based on the visual availability of the features, access to the features, and the conditions as of early April 2006. If additional follow-up to confirm or substantiate conditions are warranted, an indication of that need is provided.

## **9. SUMMARY OF RECOMMENDATIONS**

Recommendations for each facility are contained in the individual visual conditions surveys that are appended to this report. Recommendations for the facilities inspected range from removing vegetation to facilitate further inspections to requiring the owners to take immediate actions to restore the integrity of the facilities. The DLNR intends to provide copies of the individual dam inspection sheets to each dam owner for their information and action.